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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,699	09/15/2003	Agnc Swerin	IP 023445	1036
7590	12/27/2007		EXAMINER	
Richard C. Stewart, II			CORDRAY, DENNIS R	
Chief Intellectual Property Counsel			ART UNIT	PAPER NUMBER
International Paper Company				1791
6285 Tri Ridge Boulevard				
Loveland, OH 45140-7910				
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			12/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/662,699	SWERIN ET AL.	
	Examiner	Art Unit	
	Dennis Cordray	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 15 October 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-36 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 10/15/2007 has been entered.

Oath/Declaration

The oath or declaration submitted 10/1/2004 is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because:

It does not state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56.

The originally submitted Oath recites the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56(a), rather than 37 CFR 1.56.

Inventorship

In view of the papers filed 10/1/2004, it has been found that this nonprovisional application, as filed, through error and without deceptive intent, improperly set forth the inventorship, and accordingly, this application has been corrected in compliance with 37 CFR 1.48(a). The inventorship of this application has been changed by addition of Michael Herman, Sen Yang, Peter F. Lee and Ladislav Bednarik as joint inventors.

The application will be forwarded to the Office of Initial Patent Examination (OIPE) for issuance of a corrected filing receipt, and correction of Office records to reflect the inventorship as corrected.

Response to Arguments

Applicant's arguments filed 10/15/2007 have been fully considered but they are not persuasive.

Minton teaches to one of ordinary skill in the art that paper having an I-beam structure comprises a high bulk central core sandwiched between two or more high modulus external plies, resulting in a very stiff sheet (col 1, lines 27-40). The instant Specification defines an I-beam structure as having strong dense outer layers and a lower density core (p 2, lines 12-13) or, more specific to the disclosed invention, a cellulosic core interpenetrated with a bulking agent and top and bottom starch-based coating layers that cover an upper and lower surface of the central layer (p 4, lines 9-22). In some embodiments, the coating layers have minimal penetration into the central layer (p 4, lines 3-8).

Sandstrom et al discloses a paper comprising a cellulosic central or core layer interpenetrated with a bulking agent and coated with a starch-based coating applied by size press. Sandstrom et al further discloses that applying starch based layers having from 20-40% solids by weight creates higher moduli and thicker layers that improve the bending and tensile stiffness of the paperboard (col 30, lines 1-20) over layers applied with a starch content of the more typical 9.8% by weight. Sandstrom et al also states that the improvement is believed to be due to the creation of an I-beam effect (col 39, lines 14-21).

One of ordinary skill in the art, reading the disclosures of Minton and Sandstrom et al, would have understood that the paper of Sandstrom et al in the embodiments discussed in the rejections herein has an I-beam structure or, at least, such structure would have been obvious. Moreover, the paper disclosed by Sandstrom et al in the embodiments discussed in the rejections herein has an I-beam structure according to the description of such structures given in the instant Specification and Minton or, at least, such structure would have been obvious.

Regarding the tensile stiffness, Figure 14 compares the increase in tensile stiffness of a paper having bulking additives and starch based layers applied at a solids content of about 32.7% vs the same paper having starch based layers applied at a solids content of about 9.8%. The data show that the whole sheet tensile stiffness increases with higher solids content of the starch based sizing solution, and may increase or decrease with the amount of bulking agent added. Thus, the disclosed I-beam effect is demonstrated. From the data presented, one of ordinary skill in the art

would have expected an increase in tensile stiffness using starch based layers applied at any solids content greater than 9.8%, although the increase might be less than that using a solids content of about 32.7%. In any case, the solids content of the starch coating is shown to be a result effective variable and it would have been within the capability of one of ordinary skill in the art to optimize the solids content to achieve the greatest benefit.

The previous rejections are maintained but have been modified to better set forth the Examiner's position. In addition, new grounds of rejection are presented as detailed below.

Claim Objections

Claims 5 and 20 are objected to because of the following informalities: the word "by" should be inserted before the word "weight". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 32, 34 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Specification fails to teach one of ordinary skill in the art how to apply a starch-based coating to the core layer by size press with no penetration into the core

layer. No examples are provided demonstrating such a coating and the application thereof. Smook (Handbook for Pulp & Paper Technologists, p 292 last 2 pars) teaches that "When the coating first contacts the paper surface, capillary forces within the sheet structure cause a movement of the water-soluble components into the smaller pores of the sheet." Smook further states that the type and amount of binder in the coating formulation influence the rate of fluid penetration into the raw stock. Paper is a porous material and one of ordinary skill in the art would have expected at least some of the coating materials to penetrate the interfiber spaces at the surface of the paper, thus resulting in some of the starch-based coating layer to be present at least in the surface of the core layer. To claim no penetration of the coating into the core layer goes counter to the teachings of the prior art and the expectations of one of ordinary skill and the method of application of a coating in such a manner is insufficiently disclosed to enable one of ordinary skill to make and practice the invention as claimed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims recite a ratio of the film thicknesses of the starch coating layers to the thickness of the paper or paperboard, but fail to specify if the ratio is applied to the

thickness of the coating of each layer with respect to the paper or paperboard or to the combined thickness of both coating layers with respect to the paper or paperboard.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 7-9, 12-20, 23, 25, 27-31, 33 and 35 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sandstrom et al (6379497) as evidenced by Mintom (5244541).

Claims 1, 8, 13, 16, 19 and 31: Sandstrom et al discloses paper board having improved bulk and stiffness, comprising:

- a) One ply (central or core layer) comprising predominantly cellulosic fibers and a bulk and porosity enhancing additive interspersed with the cellulosic fibers and distributed throughout the thickness of the paperboard,

b) A size-press applied starch binder and pigment coating adjacent to both surfaces (top and bottom layers covering both upper and lower surfaces of the central layer) and penetrating into the board to a controlled extent (col 1, lines 54-62; col 5, lines 37-57; col 11, lines 52-53; col 24, line 2 to col 25, line 10).

The paperboard exhibits superior bending and tensile stiffness (col 6, lines 50-51). The three layer paperboard is structurally identical to that as claimed, thus possesses the same properties because, where the claimed and prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). In other words, when the structure recited in the reference is substantially identical to that of the claims, the claimed properties or functions are presumed to be inherent. The paperboard thus inherently has the claimed I-beam structure or, at least, it would have been obvious to one of ordinary skill in the art to obtain the claimed I-beam structure.

Alternatively, Minton teaches to one of ordinary skill in the art that paper having an I-beam structure comprises a high bulk central core sandwiched between two or more high modulus external plies, resulting in a very stiff sheet (col 1, lines 27-40). The instant Specification defines an I-beam structure as having strong dense outer layers and a lower density core (p 2, lines 12-13) or, more specific to the disclosed invention, a cellulosic core interpenetrated with a bulking agent and top and bottom starch-based coating layers that cover an upper and lower surface of the central layer (p 4, lines 9-

22). In some embodiments, the coating layers have minimal penetration into the central layer (p 4, lines 3-8).

One of ordinary skill in the art, reading the disclosures of Minton and Sandstrom et al, would have understood that the paper of Sandstrom et al in the embodiments discussed in the rejections herein has an I-beam structure or, at least, such structure would have been obvious. Moreover, the paper disclosed by Sandstrom et al in the embodiments discussed in the rejections herein has an I-beam structure according to the description of such structures given in the instant Specification or, at least, such structure would have been obvious.

Regarding the penetration of the coating into the center layer, the word "minimal" is a relative term that means different things to different observers and is undefined in the instant Specification. Therefore, without clear recitation of what the term "minimal" is intended to encompass, the Examiner believes that the disclosure of Sandstrom is adequate and proper to reject the claims as presently worded/recited.

Sandstrom et al discloses a method for making paperboard comprising:

- a) providing a furnish having cellulosic fibers, a bulk enhancing agent (e.g.- microspheres), a retention aid and other additives,
- b) forming a fibrous embryonic web,
- c) drying the web,
- d) size-pressing the web with a starch and pigment coating, and
- e) drying the fibrous web (col 1; lines 59-62; col 6, lines 50-65; col 11, lines 13-60).

Claims 2-3, 15 and 17-18: Sandstrom et al discloses a basis weight for the paperboard of 40 to 320 lb/3000 ft² (65-520 gsm) and a starch coating weight of 1 to 30 lb/3000 ft² (1.6-49 gsm) (col 2, lines 3-5; col 5, lines 45-50; col 24, lines 5-16). The disclosed ranges significantly overlap the claimed ranges. From the disclosed weights of paperboard and coating and using typical starch and fiber densities between 0.5 and 1 g/cc, the range for ratio of thickness of the coating to central layer overlays the claimed ratios or, at least, obtaining ratios within the claimed range would have been obvious to one of ordinary skill in the art.

Claims 5, 20, 27-30, 33 and 35: Sandstrom et al discloses that the size press starch has solids content between 20 and 40%, which touches the claimed range (col 30, lines 3-6). The Examiner believes that there is no significant difference between a solids content of 20% and a solids content of 18%, and thus considers the upper claimed range of 18% solids to be at least obvious over the disclosure of Sandstrom et al. There is no evidence in the instant Specification that would distinguish the product prepared with an 18% starch solution as having unexpected advantages over that prepared with a 20% solution.

Claim 7: Sandstrom et al discloses that the bulking additive can be microspheres added to the fibers prior to formation of the embryonic web made from polyvinylidene chloride, polyacrylonitrile, poly alkyl-methacrylates, polystyrene or vinyl chloride (col 6, line 50 to col 7, line 7).

Claim 8: Sandstrom et al discloses that the furnish comprises a retention aid (col 7, lines 18-20).

Claims 9, 14 and 23: Sandstrom et al discloses that the furnish, and therefore the center layer formed from the furnish, comprises a sizing agent and pigments (col 7, lines 18-23; col 11, lines 24-26). Sandstrom et al further discloses suitable pigments to include clays, talc, silica, TiO₂ and calcum carbonate (col 18, lines 31-35). Many of these additives are also commonly used as fillers, thus the paperboard comprises fillers.

Claim 12: The disclosed pigments will alter the viscosity of the coating, thus are viscosity modifiers.

Claim 25: Sandstrom et al further discloses suitable pigments to include clays, talc, silica, TiO₂ and calcum carbonate (col 18, lines 31-35).

Claims 4, 6, 10-11, 21-22 and 24 are rejected under 35 U.S.C. 103(a) as unpatentable over Sandstrom et al.

Claims 4 and 21: Sandstrom et al does not disclose a metered size press; however, using a metered size press would have been obvious to provide an even coating.

Claims 6 and 22: The use of the claimed diamide salt as the bulk enhancing additive in Sandstrom et al would have been obvious since it is a conventional and commercially available bulk enhancing additive as evidenced by page 6 of the instant specification.

Claims 10 and 24: Sandstrom et al discloses starch based coatings that comprise a cationic starch, anionic starch or amphoteric starch binder (col 18, lines 13-

24). Potato, corn, wheat, rice and tapioca starches are well known sources of starch that would have been obvious to one of ordinary skill in the art.

Claim 11: The surface layer of the board is surface sized or coated with starch, polymer latex, epoxy resin, pigments, and combinations thereof (col 18, lines 13-35). The claimed crosslinking agent reads on the epoxy disclosed.

Claim 26 is rejected under 35 U.S.C. 103(a) as unpatentable over Sandstrom et al in view of Stotler (5000788).

Sandstrom et al does not disclose pre-cooking the starch with a borate.

Stotler discloses a method for preparing starch based corrugating adhesives (Abs). The starch is cooked and a borating additive, such as boric acid or borax, is added to stabilize the viscosity at its lowest viscosity corresponding to a thorough dispersion of the starch (col 2, line 62 to col 3, line 6; col 3, lines 60-66).

The art of Sandstrom et al, Stotler and the instant invention is analogous as pertaining to the preparation of starch solutions. Cooking starch prior to use in papermaking is a well known and typical practice. The cooking would have only been expected to affect the starch and not a borate chemical, thus cooking with or without the borating additive would have been obvious to one of ordinary skill in the art in the process of Sandstrom et al in view of Stotler as a functionally equivalent process having the same result, stabilizing the viscosity of the cooked starch.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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